The Need for Action:

Policy Options for Greening the Road Sector

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Outline

1. The need for action
2. Strategies for reducing emissions*
3. Options for implementing the strategies*
4. Conclusions

Note:These sections are based on the DOT report (2010) Transportation's Role in Reducing Greenhouse Gas Emissions, Volume 1 and 2

The current model does not scale: The road sector accounts for the bulk of emissions from transport sector, and these are growing

- Cutting GHG emissions is no longer a choice but a necessity

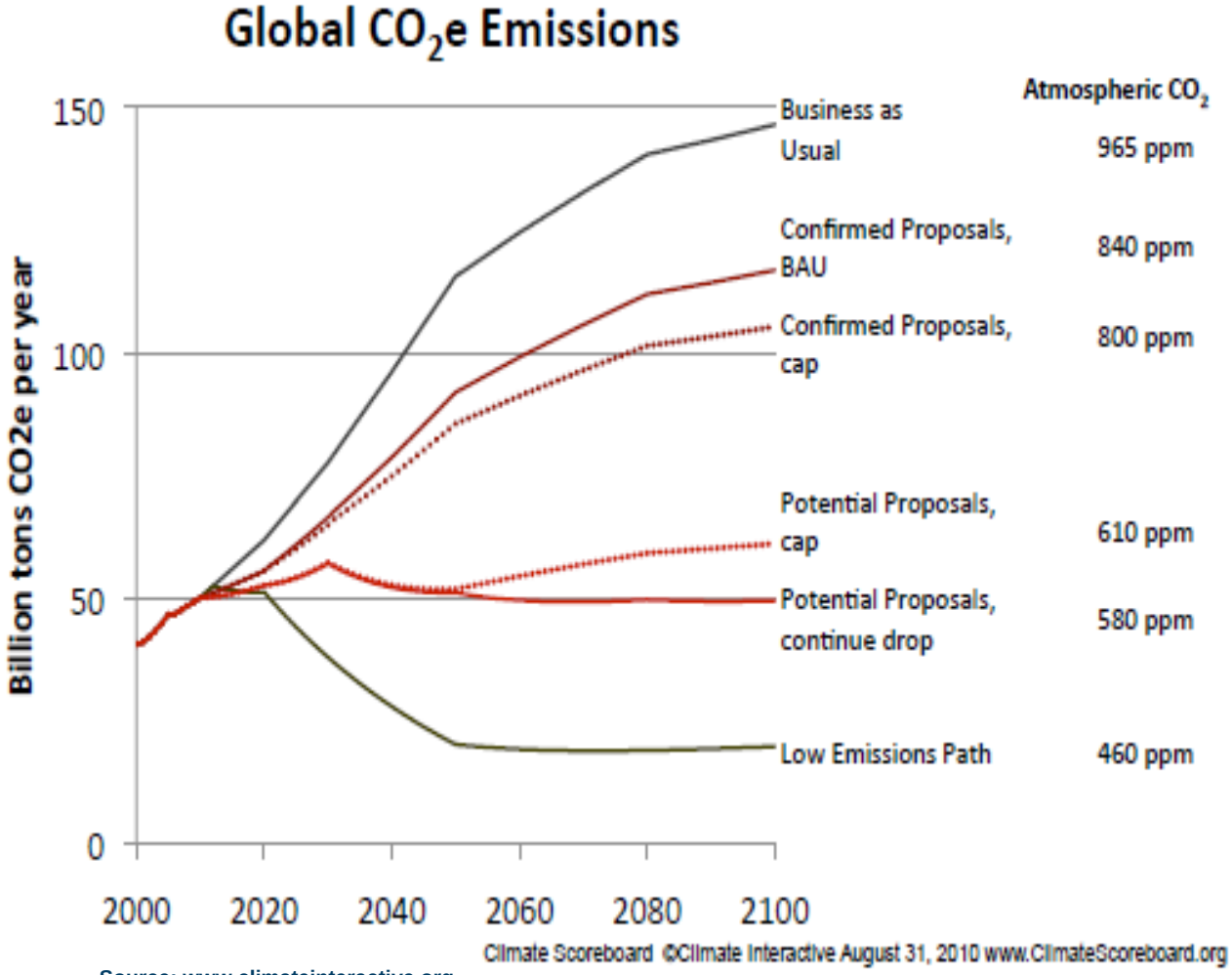
- Emissions from the transport sector are growing

- We don’t have enough oil (and definitely not in the right places) to meet demand
  - World GDP is growing
  - Population is increasing (over 9 billion in 2050)
  - Motorisation rate is increasing (over 7 billion at US rates)
  - Implied oil consumption is huge (440 million barrels oil/day)
  - Current production: 82 million barrels oil/day

- Congestion has become a global phenomena

- People don’t like pollution, noise, and being hit by cars

Cutting emissions is a necessity

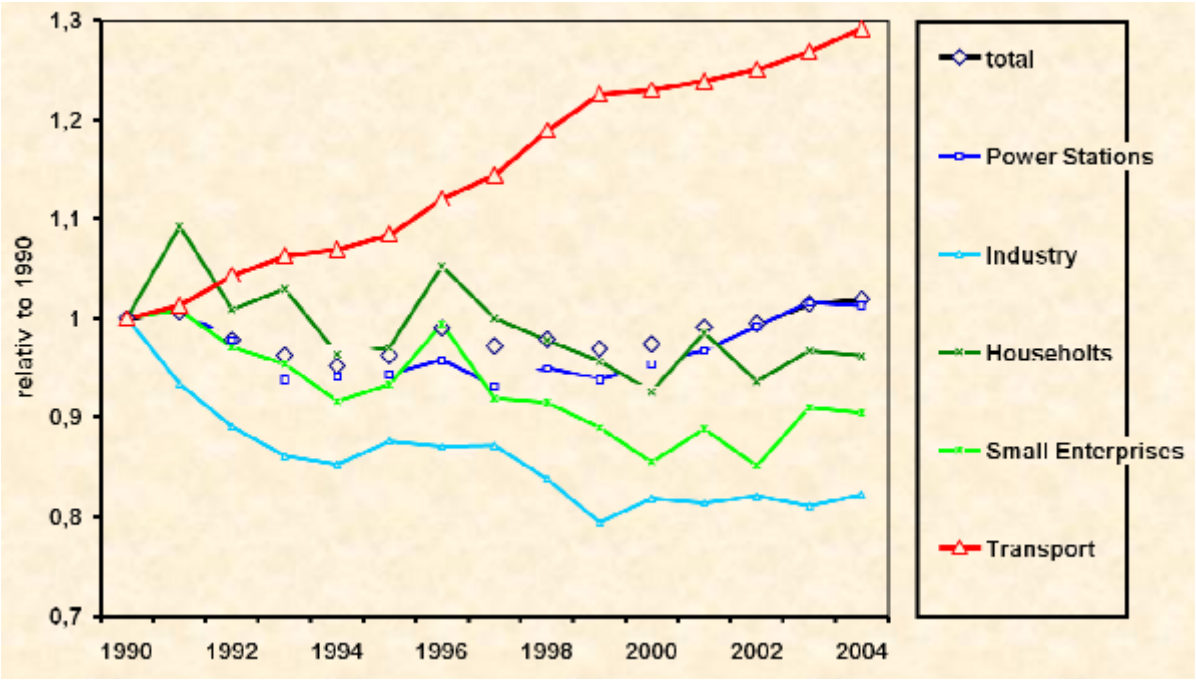


Source: www.climateinteractive.org

2100 Values

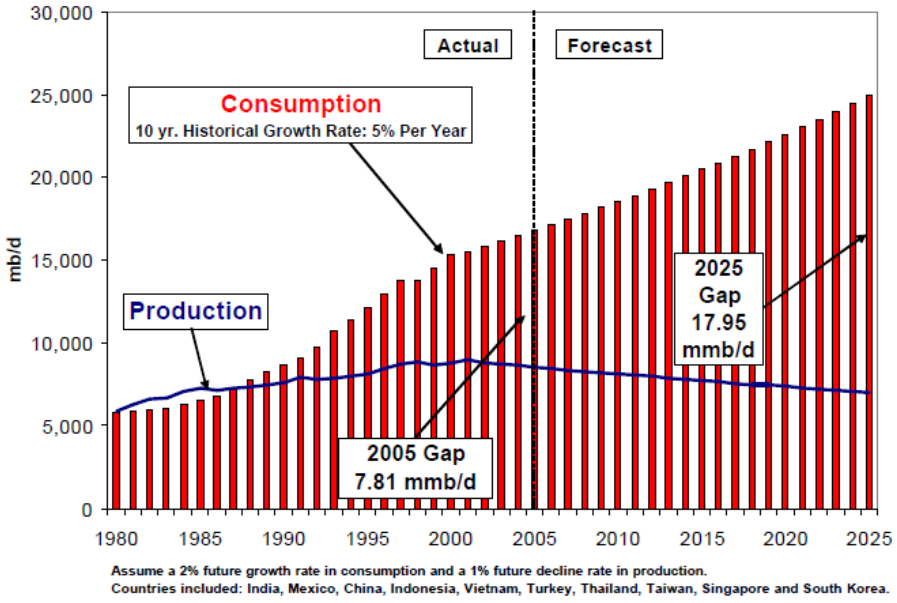
	Atmospheric CO_2	Atmospheric CO_2e	Temp. Increase Over Preindustrial (90% C.I.)
Business as Usual	965 ppm	1410 ppm	4.8°C (2.9°-7.7°) 8.7°F (5.2°-13.9°)
Confirmed Proposals, BAU	840 ppm	1140 ppm	4.2°C (2.5°-6.7°) 7.5°F (4.5°-12.1°)
Confirmed Proposals, cap	800 ppm	1060 ppm	4°C (2.4°-6.4°) 7.2°F (4.3°-11.5°)
Potential Proposals, cap	610 ppm	765 ppm	3.1°C (1.8°-4.9°) 5.5°F (3.3°-8.8°)
Potential Proposals, continue drop	580 ppm	715 ppm	2.9°C (1.7°-4.6°) 5.2°F (3.1°-8.3°)
Low Emissions Path	460 ppm	520 ppm	2°C (1.2°-3.2°) 3.6°F (2.1°-5.7°)

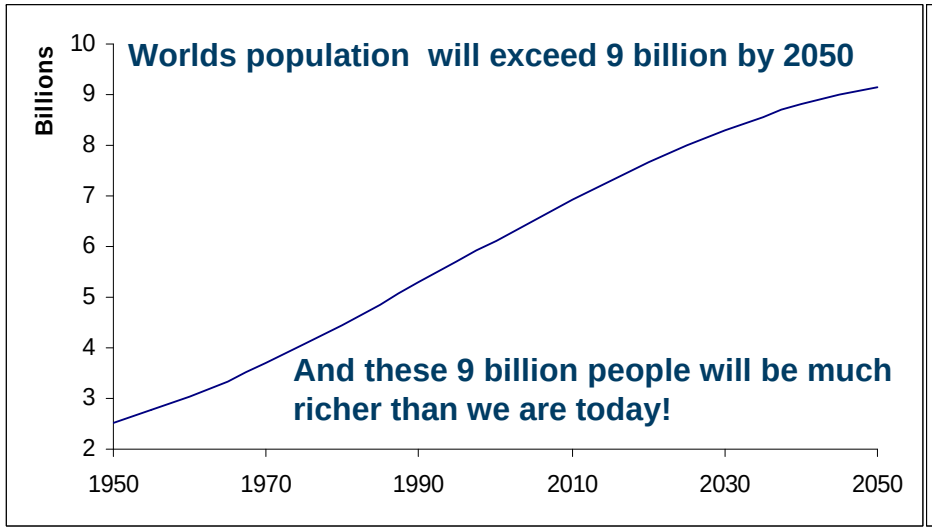
Risks of serious, irreversible impacts
Climate change threatens the basic elements of life
Chance of a 2°C increase is 77-99%
Acting today is sensible (1% of GDP)



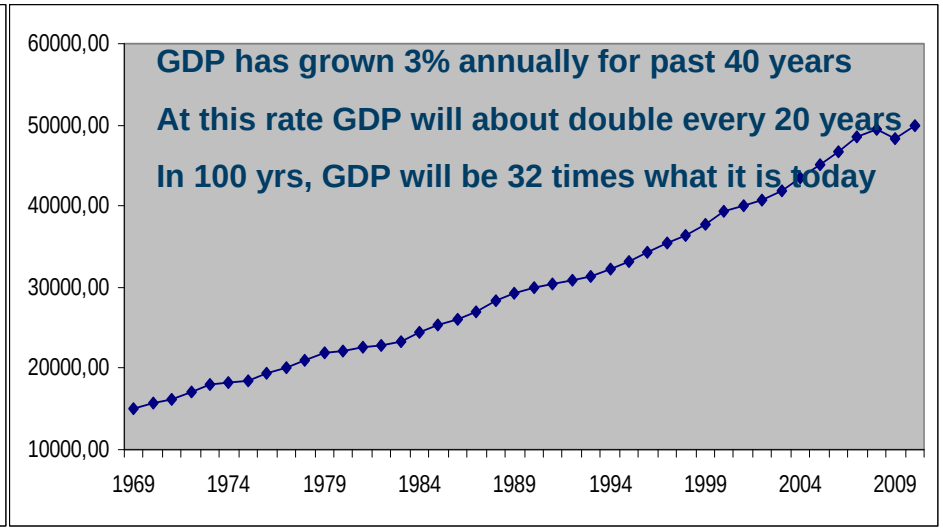
Emissions from transport sector are increasing (transport uses almost 2/3rds of the worlds oil)

The gap between production and consumption is forecast to increase

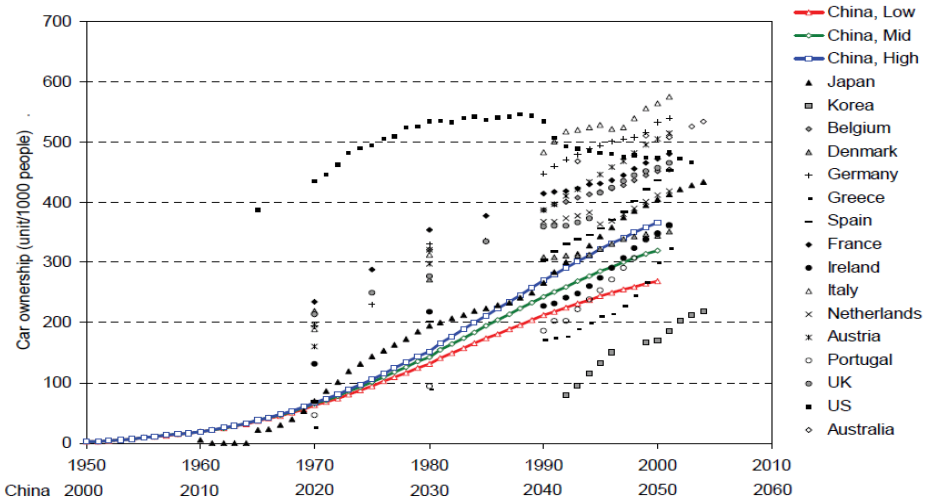




Source: Data from UNPP



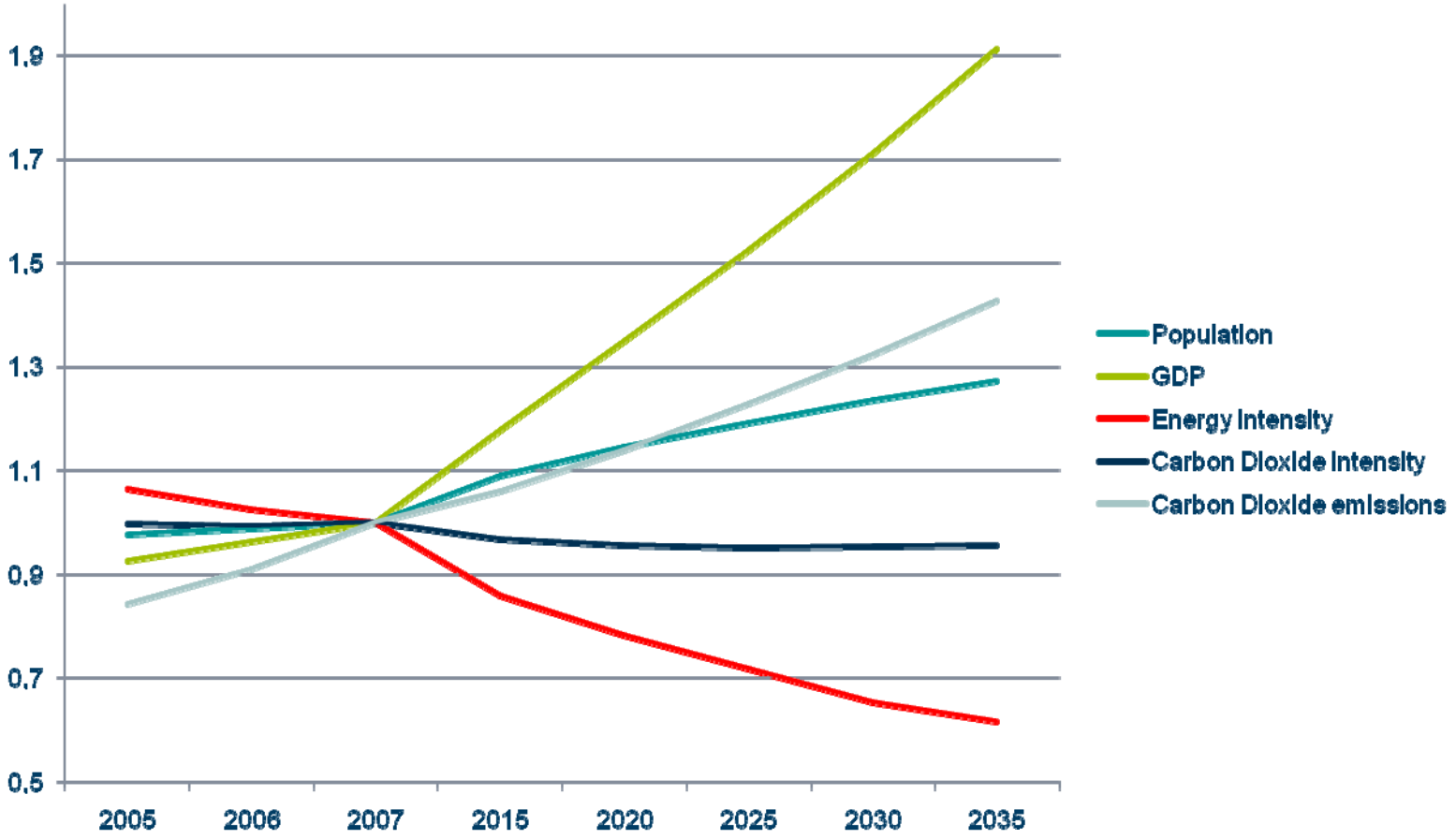
Source: Source: World Bank World Development Indicators, International Financial Statistics of the IMF HIS Global Insight, and Oxford Economic Forecasting, as well as estimated and projected values developed by the Economic Research Service all converted to a 2005 base year.



Source: M. Wang, H. Huo, and L. Johnson (2006) Projection of Chinese Motor Vehicle Growth, Oil Demand, and CO2 Emissions through 2050, Argonne National Laboratory

Motorisation rates are increasing rapidly - China alone will have close to 700 million vehicles in 2050

Technological improvements are swamped by population and GDP growth (trends in the four factors driving emissions (2007=1))



Source: Data (2009) from U.S. Energy Information Administration (2009)

Strategies for reducing emissions

1. Introduce low-carbon fuels;
2. Increase vehicle fuel economy;
3. Improve transportation system efficiency; and
4. Reduce carbon-intensive travel activity.

5. Align transportation planning and investments to achieve GHG reduction objectives; and
6. Economy wide pricing of carbon

	Reduction by 2030 (%)	
	Vehicle	Transport sector
1. UPTAKE OF LOW CARBON FUELS (Ethanol, biodiesel, natural gas, liquefied petroleum gas, synthetic fuels, hydrogen, and elec Bio-fuels from cellulosic sources offer potentially large reductions, more R&D is needed. Current fleet can operate on low blends, higher blends require vehicle modification**tricity)**		
Fuel cells, and low-carbon H2 production, distribution and storage become reality	80	18-22 (2050)
Breakthrough in battery technology		25-30 (2050)
2. INCREASED FUEL EFFICIENCY (engine and transmission design, light weight materials, improved aerodynamics, less rolling resistance) Technology is well developed, potential for offsetting higher vehicle costs by fuel savings technology penetration limited by time for fleet replacement		
Advanced fuel vehicles Diesels Hybrid electrics Plug/in hybrid electrics	8-30 16 and more 25-55 45-75	

	Reduction by 2030 (%)	
	Vehicle	Transport sector
3. IMPROVED EFFICIENCY OF TRANSPORT SYSTEM (Design, construction and operation of networks) Significant co-benefits, but new "induced"demand		3-6
Speedlimits		2-3
Traffic management, travel and trip information, incident management		1-3
4. REDUCING CARBON INTENSIVE TRAVEL (Telecommuting, increasing load factors, modal shift)		5-17
Pricing		> 3
Public transport		3-10
Non-motorised transport		
Land use changes		
Public information campaigns		

	Reduction by 2030 (%)	
	Vehicle	Transport sector
5. Transport planning and investment		
Technical assistance		
Regulations (for consideration of GHG issues and land use planning)		
Financial incentives (for planning and implementing GHG reduction strategies, meeting targets)		
6. Pricing carbon		2 - 23
Motor fuel tax		2-3
Carbon tax		
Carbon credits and trading		>17

Policy options to implement emission reduction strategies

	Stimulate uptake of Low carbon fuels	Increase vehicle fuel efficiency	Increase transport system efficiency	Reduce travel
Efficiency standards	x	X		
Planning and funding			x	X
Market incentives	x	x	x	x
R&D	x	x	x	x
Carbon pricing	x	x	x	x

Efficiency standards

- Fuel efficiency standards for vehicles and manufacturer fleets
- Emission standards
- Low carbon fuel standards

Modest to moderate impact in short-term, potentially very large impact in mid to long-term

Planning and funding

- Providing technical assistance to planning agencies and organisations
- Speed limit reductions
- Operational improvements and pricing
- Investing in public transport and non-motorised transport infrastructure and services

Modest impact in short-term, moderate impact in medium-term

Market based mechanisms

- Tax credits and /or subsidies linked to distance travelled

Moderate in medium term, large effect in long-term (depends on pricing level)

Research and development

- Financing research on vehicle and fuel technology
- Development of data, tools, and decision-support to improve transportation policy making and choices
- Policy research on options, costs and benefits, and distribution of these costs and benefits

Large impact in the long term

Economy wide carbon pricing

- Cap and trade
- Carbon tax

Moderate in the medium/term, large in the long/term

Conclusions

- There is no magic bullet, intelligent policy packages are needed
- Technological options are promising in the long-term, but offer little in the short to medium-term
- Non-technical options are promising and cost-effective

However, there are some troubling issues

- However, there are some troubling issues:
  - The methods used to evaluate effectiveness of measures are largely financial-technical and NOT based on welfare economics. This means that policy may just shift the problem
  - Lot of technical analysis is based on laboratory conditions
  - Second order effects (induced demand) are uncertain and typically ignored
  - Options to bring about behavioural change are not well researched, or properly understood
  - The interaction among policy options are poorly understood